Site:
Break: 3.8
Other: 11/18/22

3 8 0113
3598

Olin

CHEMICALS GROUP

INVESTIGATION REPORT

OLIN CORPORATION
McINTOSH, ALABAMA

OLIN BASIN

Environmental Affairs Department
Charleston, Tennessee

INVESTIGATION REPORT

OLIN CORPORATION
McINTOSH, ALABAMA

OLIN BASIN

APPROVALS:

Project Manager: _____
A. L. Feldman

Quality Assurance Officer: _____
J. C. Brown

Manager, S.E. Regional Environmental Affairs: _____
D. R. Vaughn

TABLE OF CONTENTS

SECTION I

INTRODUCTION

The purpose of this study was an investigation of potential releases of hazardous constituents to the Olin Basin in satisfaction of the requirements of 40 CFR 264.101 of RCRA and to provide Remedial Investigation information for CERCLA in response to the Forward Study Report, June 6, 1986 (Document Control #268-WPI-RT-CUZY-1, page 4-2 and 4-3), Attachment 1.

The sampling of the Olin Basin was conducted according to the Study Plan and Investigation dated October 1987 (Appendix 1) as amended and approved by a letter from Mr. James H. Scarbrough (USEPA) to Mr. Arnold Feldman (Olin) on November 10, 1987, Attachment 2, and modified to meet certain requirements of USEPA as specified in a letter from Mr. John A. Trudell, III, SPM (USEPA) to Mr. Arnold Feldman (Olin) received on November 30, 1987, Attachment 3.

This document presents the results of the sampling and analytical programs described in the Study Plan and Investigation of the Basin at the Olin McIntosh Alabama facility. The level of quality assurance, i.e., the number of blanks, spikes and replicates met or exceeded the requirements of the EPA's Contract Laboratory Program.

SECTION II

SUMMARY OF RESULTS

The sampling of the Olin Basin took place on December 8 and 9, 1987. The analytical data was received from BCM Laboratories on March 31, 1988. Analysis of the data indicates the following:

(1) No 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, pentachloronitrobenzene or hexachlorobenzene were detected in the Basin water.

(2) Mercury detected in Basin water was at or below the Primary Drinking Water Level (2.0 µg/l).

(3) There were minor levels of mercury in the sediments.

(4) The concentration of mercury in extracts from the sediments per the EP test were near or below the limit of detection (0.2 µg/l), and all were below the Primary Drinking Water Level.

(5) Concentrations of dichlorobenzenes in the sediments were near or below the limit of detection.

(6) Pentachloronitrobenzene (PCNB) was at or below the MEG (Multimedia Environmental Goals for Enironmental Assessment, EPA-600/7-77-136a, November 1777, and EPA-600/7-8-041, March 1980, USEPA, Industrial Environmental Research Laboratory, Research Triangle Park, NC.) for soil divided by a safety factor of 10.

(7) Hexachlorobenzene was below the MEG for soil divided by 10 for all but one sample. Reanalysis of the sample showed hexachlorobenzene below the MEG divided by a safety factor of 10.

In conclusion, results of the sampling and analysis of the Olin Basin indicate that there is little or no contamination. This indicates that no further action is warranted.

SECTION III

SAMPLING PROGRAM/FIELD INVESTIGATION

Sampling of the sediments and surface water was conducted on December 8 and 9, 1987 under the observation of Mr. John Trudell (USEPA) and Mr. Charles Till (USEPA). Members of the Olin sampling team included: Mr. K. D. Roberts (Sampling Coordinator), Mrs. T. B. Odom (Field Project Officer), Mr. R. J. Cheek and Mr. S. E. Anderson. A copy of the Field Sampling Notes and Field Overview Checklist are attached as Appendices 2 and 3, respectively. There were no major problems encountered during the sampling. Two minor changes were made in the sampling procedures. The weighted bottle sampler could not be used without disturbing the sediment where water depths were less than 2 feet. In those cases, water samples were collected by hand at 50% depth. In cases of less than 1.0 feet of water sediment samples were collected using pre-cleaned stainless steel spoons. These changes were approved in the field by the EPA observers.

Duplicate water and sediment samples were collected from each sampling location. In addition, replicates for EPA were collected from one water sampling location and one sediment sampling location. Field blanks were prepared each day of sampling. A sample of the rinse water from the ponar dredge cleaning was also collected. Upon collection, each sample was assigned a random number (see Tables 1 through 3) and labelled. Immediately after labeling, each sample was stored on ice. Prior to shipping, sample seals were placed on each bottle and the shipping container. Chain-of-Custody was prepared and accompanied each sample container. Copies of the completed Chain-of-Custody are attached in Appendix 4.

EPA provided Olin with eight samples for analysis. These samples serve as a further quality assurance check on the laboratory. EPA QA samples were re-labeled with a random number and shipped to BCM Laboratory under Olin Chain-of-Custody. Table 4 lists the sample numbers assigned to the EPA QA samples.

The samples were shipped by Emory Air Freight with next day delivery to Olin's contract laboratory BCM, i.e. Plymouth Meeting, Pennsylvania. All water and sediment samples were sent to BCM in duplicate in case of loss of a sample due to breakage. After samples arrived at BCM, one sample from each sampling location was designated for analysis. Four blind duplicate water samples (two for mercury and two for organics) and two blind duplicate sediment samples were designated for analysis for intra-laboratory quality assurance as required by the Plan. The sampling locations were not revealed to the laboratory. Four additional water samples (two for mercury and two for organics) were designated as laboratory spike samples. The corresponding replicate sample was revealed to the laboratory so that they could calculate spike recoveries. As before, sample locations were not revealed. All EPA samples were designated for analysis.

SECTION IV

ANALYTICAL RESULTS AND ANALYSIS

GENERAL

Final analytical results were received from BCM Laboratories on March 31, 1988. A complete summary of the analytical results is given in the attached tables:

Table No.	Analysis
V	Mercury - Water
VI	Organics - Water
VII	Mercury - Sediment
VIII	Dichlorobenzenes - Sediment
IX	Hexachlorobenzene and Pentachloronitrobenzene - Sediment
X	EPA Supplied Samples

MERCURY - WATER (TABLE V)

All mercury in water samples were at or below the Primary Drinking Water Standard of 2.0 µg/l. The replicate analyses were within acceptable tolerance of each other.

ORGANICS - WATER (TABLE VI)

All organics in water samples were below a detectable level of 10 µg/l for the constituents analyzed, i.e., 1,2-Dichlorobenzene, 1,4-Dichlorobenzene,

hexachlorobenzene, and pentachloronitrobenzene. The replicate analytical results were all identical to the primary sample, i.e., below detectable levels. One sample (Olin #574, BCM #30385) experienced low surrogate recovery, but was accepted based on other QA/AC data and the consistency of the rest of the data set.

MERCURY - SEDIMENT (TABLE VII)

The total mercury in sediment varied from a low of 0.4 mg/kg to a high of 60.5 mg/kg. Extractable mercury (EP leachate test) concentration in extracts from the sediment was below a detectable level of 0.2 µg/l on all samples but one, which was 0.4 µg/l. While several duplicate sediment samples were analyzed after the 30 day holding time had expired; this should not affect the analysis for mercury which is non-volatile when kept refrigerated. After the 30 day holding time had expired, Olin received preliminary verbal results. Based upon these results, Olin decided to run additional analysis to confirm the insignificant contamination levels. These duplicate analyses were not part of the original analytical plan.

The sample which showed the most significant variation from its replicate was the sample with the highest concentration (60.5 mg/kg) with the replicate of 9.0 mg/kg. All samples indicated a relatively high standard deviation between replicates. Although the samples were thoroughly mixed in the field, this is probably due to the non-homogeneous nature of sediment samples.

DICHLOROBENZENES - SEDIMENT (TABLE VIII)

All the sediments analyzed for dichlorobenzenes (1,2 and 1,4 isomers) were at or below 0.66 mg/kg; which in all but two (2) samples (Location A and I) was the detectable level. One replicate for location A showed detectable levels of each isomer, but at 0.35 and 0.33 mg/kg. The replicate for location A was analyzed on a

different day when the DL was 0.66 mg/kg. The sample for location "I" was re-extracted and analyzed along with the replicate sample after the 30 day holding time had expired based upon preliminary verbal results received after the 30 day holding time had expired. Neither sample contained dichlorobenzene above the detectable level. One sediment matrix spike (Olin #577; BCM #30495) resulted in low recovery, perhaps caused by matric interferences. Other spikes had good recoveries. The data are considered acceptable.

HEXACHLOROBENZENE AND PENTACHLORONITROBENZENE (TABLE IX)

Results for pentachloronitrobenzene in the sediment varied from a low of below detectable level (13 of the 21 samples) of 0.66 mg/kg to a high of 14.5 mg/kg. The MEG (Multimedia Environmental Goals for Environmental Assessment, EPA-600/7-77-136a, November 1977, and EPA-600/7-8-041, March 1980, USEPA, Industrial Environmental Research Laboratory, Research Triangle Park, NC) for pentachloronitrobenzene in soil is 1,000 mg/kg. The highest value obtained divided by a safety factor of 10 was still lower than the MEG.

Results for hexachlorobenzene in the sediment ranged from a low of below detectable level of 0.66 mg/kg (7 of 21 samples) to a high of 114 mg/kg. All but one sample was at least 10 times lower than the MEG for hexachlorobenzene in soil. The Location "I" sample was re-extracted and along with its replicate analyzed. The holding time for these samples also exceeded 30 days, but hexachlorobenzene is essentially non-volatile and the results should not have been affected. Reanalysis of the same sample showed a value of about 50% less and the replicate was essentially the same. It is believed that the non-homogeneous make-up of sediment samples caused this variation. This is further confirmed by John Tobin, Jr., Operations Manager for BCM who explains the sample variations in that "This can only be attributed to non-homogeneous matrix and holding times", Attachment 4.

RINSE WATER

As required by USEPA Region IV Standard Operating Procedures and Quality Assurance Manual, appendix B, two rinse water samples from the ponar dredge were subjected to analysis. One rinse water sample was fixed with nitric acid which could only be analyzed for mercury. The results was 40 µg/l which was below the mercury levels in the sediments and would not interfere with the sediment result. The second sample was not fixed and was analyzed for both mercury and organics. All organics were below detectable levels of 0.01 mg/kg. The mercury for the second rinse water sample was at 50 µg/l which is below the level of mercury in the sediments and would not have interfered with the results.

TRIP AND FIELD BLANKS

Trip blanks from the laboratory were analyzed for both days along with field blanks for both days. All blanks were below detectable levels for all parameters.

QUALITY ASSURANCE AND QUALITY CONTROL

Complete copies of all analytical analysis are attached in Appendix 5. Included are the analytical results for the QA/QC samples including blanks, spikes, replicates, and laboratory QA/QC samples that meet or exceed the requirements of EPA's Contract Laboratory Program. [Note that in Volume I, the list of sample numbers located before the Laboratory Result Sheet has a typographical error. BCM No. 7A 30547 appears twice, causing an offset of one in list enteries after No. 2A 30547. The Laboratory Results Sheets have the correct BCM Number relative to Olin sample number (Location)].

LABORATORY AUDIT

As part of the QA/QC program, Olin conducted an inspection and audit of the BCM Laboratory in Plymouth Meeting, Pennsylvania. The facility appeared to be adequately staffed and sufficiently equipped. A copy of the audit report is attached (Attachment 5).

SECTION V

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were drawn from the investigation and sampling plan:

(1) No organic constituents were found in the water.

(2) Mercury in the water was at or below the Primary Drinking Water Standard.

(3) There were minor levels of mercury in the sediments. The mercury is not readily leachable.

(4) There were no dichlorobenzenes (1,2 and 1,4 isomers) in the sediments.

(5) The pentachloronitrobenzene in the sediments was below the MEG for soil divided by 10.

(6) Except for a single point, all hexachlorobenzene samples in the sediment were below the MEG for soil divided by 10.

(7) The single point for hexachlorobenzene in sediments upon reanalysis showed a value below the MEG divided by 10 as did the average of the two.

(8) The single point for hexachlorobenzene above the MEG divided by 10 was probably due to a non-homogeneous sample.

In summary, results of the sampling and investigation of the Olin Basin indicate there is insignificant contamination. No further work is warranted.

007/ALF11

TABLES

TABLE I

WATER SAMPLE LOCATIONS

Location	Sample Number Organics	Mercury
A	420(1) 672(3)	399(1) 712(3)
B	574(1) 424	966(1) 257
C	869(1) 362	107(1) 925
D	102(1) 737	525(1) 349
E	560(1) 341(2)	523(2) 442(2)
F	777(1) 654(2)	316(1) 838(2)
G_N	509(1) 451	406(1) 312
Gs	696(1) 150	221(1) 492
Rinse Water	281(1) 981(1)	281(1) 981(1)
Field Blank	878(1) 942	283(1) 908

(1) Designated for initial analysis as primary sample
(2) Designated for analysis as blind duplicat
(3) Designated for analysis as specified duplicate

TABLE II

SEDIMENT SAMPLE LOCATIONS

Location	Sample Number
A	615(1) 537(3)
B	941(1) 308
C	790(1) 782
D	907(1) 237
E	483(1) 217(2)
F	577(1) 401(2)
G_N	267(1) 919
Gs	538(1) 507
H	183(1) 532
I	807(1) 384

(1) Designated for initial analysis as primary sample
(2) Designated for analysis as blind duplicat
(3) Designated for analysis as specified duplicate

TABLE III

FIELD SAMPLES SENT TO EPA

TYPE OF SAMPLE	OLIN SAMPLE NO.	SAMPLE LOCATION
Water (Organics)	279	C
Water (Mercury)	263	C
Sediment (Organics and Mercury)	343	E
Trip Blank (2 samples)	No Number	--

TABLE IV

SAMPLES RECEIVED FROM EPA

TYPE OF SAMPLE	OLIN SAMPLE NO.
BNA H_2O Spike	118
BNA H_2O Blank	143
Metals Blank	136
BNA Sediment Blank	760
Metals Blank (Sediment)	810
BNA Sediment Spike	702
ICS	948

TABLE V

MERCURY - WATER

(All values in ug/l)

Location	Concentration	Replicate Concentration	Comments
A	1.0	1.0	Designated Rep.
B	2.0	NA	
C	0.7	NA	
D	0.7	NA	
E	0.6	< 0.2	Blind Rep.
F	0.7	0.6	Blind Rep.
G_N	0.4	NA	
Gs	0.5	NA	

NA - Not analyzed

TABLE VI

ORGANICS - WATER

(All values in µg/l)

Location	1,2-Dichloro-benzene		1,4-Dichloro-benzene		Pentachloro-nitrobenzene		Hexachloro-benzene		Commments
	Conc.	Rep.	Conc.	Rep.	Cond.	Rep.	Conc.	Rep.	
A	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	Designated Rep.
B	<10.0	NA	<10.0	NA	<10.0	NA	<10.0	NA	
C	<10.0	NA	<10.0	NA	<10.0	NA	<10.0	NA	
D	<10.0	NA	<10.0	NA	<10.0	NA	<10.0	NA	
E	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	Blind Rep.
F	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	Blind Rep.
Gs	<10.0	NA	<10.0	NA	<10.0	NA	<10.0	NA	
G_N	<10.0	NA	<10.0	NA	<10.0	NA	<10.0	NA	

NA - Not Analyzed

TABLE VII

MERCURY - SEDIMENT

Location	Total (mg/kg)	Extract (ug/l)	Replicate Total (mg/kg)	Replicate Extract (ug/l)	Comments
A	~~0.4~~ 1.45	<0.2	<0.3	<0.2	Designated Rep.
B	~~2.1~~ 4.1	<0.2	2.65(1)	<0.2(1)	
✓C	~~60.5~~ 82.9	<0.2	9.0(1)	<0.2(1)	
✓D	~~1.55~~ 2.56	<0.2	1.7(1)	<0.2(1)	
E	~~4.5~~ 15.8	<0.2	9.5	<0.2	Blind Rep.
F	~~25.5~~ 56.7	<0.2	8.0	<0.2	Blind Rep.
G_N	~~2.55~~ 4.4	0.4	NA	NA	
Gs	~~2.6~~ 4.9	<0.2	NA	NA	
H	~~3.95~~ 6.0	<0.2	NA	NA	
I	~~11.0~~ 17.1	<0.2	4.0(1)	<0.2(1)	

NA - Not Analyzed
(1) - Analyzed after 30 day holding time

TABLE VIII

Dichlorobenzenes - Sediments

(All values in mg/kg)

Location	1,2-Dichlorobenzene Conc.	1,2-Dichlorobenzene Rep.	1,4-Dichlorobenzene Conc.	1,4-Dichlorobenzene Rep.	Comments
A	0.35	<0.66	0.33	<0.66	Designated Rep.
B	<0.66	<0.66(1)	<0.66	<0.66(1)	
C	<0.66	<0.66(1)	<0.66	<0.66(1)	
D	<0.66	<0.66(1)	<0.66	<0.66(1)	
E	<0.66	<0.66	<0.66	<0.66	Blind Rep.
F	<0.66	<0.66	<0.66	<0.66	Blind Rep.
G_N	<0.66	NA	<0.66	NA	
Gs	<0.66	NA	<0.66	NA	
H	<0.66	NA	<0.66	NA	
I	<0.66/<0.33(2)	<0.33(1)	<0.66/<0.33(2)	<0.33(1)	

NA - Not Analyzed
(1) - Extracted and analyzed after 30 day holding time
(2) - Sample re-extracted and analyzed after 30 day holding time

TABLE IX

HEXACHLOROBENZENE AND PENTACHLORONITROBENZENE - SEDIMENTS

(All values in mg/kg)

Location	Hexachlorobenzene Conc.	Hexachlorobenzene Rep.	Pentachloronitrobenzene Conc.	Pentachloronitrobenzene Rep.	Comments
A	31.5	35.3	5.72	11.7	Designated Rep.
B	2.4	2.1(1)	<0.66	<0.66(1)	
C	21.0	1.9(1)	<0.66	<0.66(1)	
D	11.3	41.7(1)	<0.66	14.5(1)	
E	<0.66	<0.66	<0.66	<0.66	Blind Rep.
F	<0.66	<0.66	<0.66	<0.66	Blind Rep.
G_N	<0.66	NA	<0.66	NA	
Gs	<0.66	NA	<0.66	NA	
H	<0.66	NA	<0.66	NA	
I	114./69.6(2)	57.5(1)	4.9/<0.33(2)	1.6(1)	

NA - Not Analyzed
(1) - Extracted and analyzed after 30 day holding time
(2) - Sample re-extracted and analyzed after 30 day holding time

TABLE X

EPA SUPPLIED SAMPLES

Sample No.	EPA I.D.	Analysis	
118	BNA H_2O Spike	1,2-Dichlorobenzene	<10.0 µg/l
		1,4-Dichlorobenzene	<10.0 µg/l
		Hexachlorobenzene	<10.0 µg/l
		Pentachloronitrobenzene	<10.0 µg/l
143	BNA H_2O Blank	1,2-Dichlorobenzene	<10.0 µg/l
		1,4-Dichlorobenzene	<10.0 µg/l
		Hexachlorobenzene	<10.0 µg/l
		Pentachloronitrobenzene	<10.0 µg/l
136	Metals Blank	Mercury	<0.2 µg/l
810	Metals Blank	Mercury (Sediment)	<0.1 mg/kg
760	BNA Sediment Blank	1,2-Dichlorobenzene	<0.33 µg/l
		1,4-Dichlorobenzene	<0.33 µg/l
		Hexachlorobenzene	<0.33 µg/l
		Pentachloronitrobenzene	<0.33 µg/l
702	BNA Sediment Spike	1,2-Dichlorobenzene	<0.33 µg/l
		1,4-Dichlorobenzene	<0.33 µg/l
		Hexachlorobenzene	<0.33 µg/l
		Pentachloronitrobenzene	<0.33 µg/l
948	ICS	Mercury	<0.2 µg/l
301	Metals Spike	Mercury	2.0 µg/l

ATTACHMENTS

3 8 0135

ATTACHMENT 1

- Although there is no apparent stressed vegetation in the wetland area and the current regulated plant effluent does not direct discharge into the basin, the wetland area is still a concern due to past activity. Since aerial photographs included in the site's Historical Analysis show direct effluent discharge into the basin prior to 1970, the basin must be considered as a possible receptor of contaminants. In addition to sampling efforts done as part of the 1977 Environmental Impact Assessment and bioassay tests performed as part of the NPDES permit requirement, the wetland area must satisfy CERCLA compliance. The CERCLA policy with regard to floodplains and wetlands is that RI/FS actions must meet the substantive requirements of the Floodplain Management Executive Order (E.O. 11988), and the Protection of Wetlands Executive Order (E.O. 11990), and Appendix A of 40 CFR Part 6, entitled Statement of Procedures on Floodplain Management and Wetland Protection.

- All monitor wells have been sampled and analyzed. The extent of ground water contamination has been identified and a remedial action plan proposed. This information is all available in the RCRA Post Closure Permit Application. In addition, approximately 5% of the wells have been subjected to Appendix VIII screening; these results are also available in the Post Closure Permit Application. Based upon the results of these actions, no further investigations should be required to satisfy CERCLA compliance.

- With regard to public health risk associated with the site, information ascertaining the potential for risk, migration pathways, rates of migration, concentration and toxicity, was submitted to EPA on August 8, 1985 in the Exposure Information Report as required by EPA Regulation 40 CFR 270.10(j).

In conclusion, the results of the previous studies and current corrective actions performed under RCRA compliance have addressed the areas of concern in sufficient detail to satisfy the RI/FS requirements of CERCLA compliance

with the exception of the CERCLA policy requirements with regard to protection of wetlands and 40 CFR Part 6.

3 8 0140

This area should be included in any future plan of action in order to satisfy CERCLA compliance requirements. The best course of action would be to include the wetlands within the RCRA compliance activities if possible. If not, the wetlands should be addressed in a separate CERCLA plan of action.

ATTACHMENT 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

NOV 1 0 1987

4WD-RCRA

Mr. Arnold Feldman
Olin Chemicals
McIntosh Plant
McIntosh, Alabama 36553

RE: Study Plan and Investigation, Olin Basin
McIntosh, Alabama Facility
EPA I.D. No. ALD 008 188 708

Dear Mr. Feldman:

We have reviewed your revised Basin Study Plan, as submitted October 22, 1987, and hereby approve procedures described therein. Our only technical comment at this time refers to item #6 on the October 22, 1987, cover letter. A nitric acid solution to be used for preservation of the mercury water samples should be pH < 2 in accordance to SW-846 Test Method 7470; September 1986.

Please contact Mr. Harold Vincent at (404)347-3433, for any questions you may have.

Sincerely yours,

James H. Scarbrough, P.E.
Chief, RCRA Branch
Waste Management Division

cc: Daniel E. Cooper, Alabama Department of Environmental Management

Rec'd--Date 11/13/87
Environmental Dept. JSV

ATTACHMENT 3

3 8 0144

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

RECEIVED
NOV 30 1987
A. L. FELDMAN

4WD-SFB

Mr. Arnold Feldman
Environmental Affairs Associate
Olin Chemicals
P.O. Box 248
Charleston, TN. 37310
(615) 336-4510

Dear Mr. Feldman:

I am writing in reference to the overview of the Basin Study Plan which must be provided by the Environmental Protection Agency Environmental Services Division (EPAESD) to insure adherence to Quality Control/Quality Assurance (QA/QC) of sampling and sample analysis for the EPA to accept the sampling data. These guidelines are outlined in the Standard Operating Procedures and Quality Assurance Manual - USEPA, Region IV, Engineering Support Branch, April 1, 1986.

To insure QA/QC of sampling methodologies, Charles Till (EPAESD) and I will be at the basin to observe sampling which is scheduled to begin on Tuesday December 8th at 7:00 am.

To insure the QA/QC of sample analysis, the EPAESD will provide sample spikes and blanks to account for ten (10) percent of the samples sent to the contract laboratory. The EPAESD will also split ten (10) percent of the samples to analyse for comparison to the contract labs analysis. The EPAESD will use sample bottles from Olin for the spikes, blanks, and splits to insure the samples maintain the same integrity. The cost of analysis of the spikes and blanks sent to the contract lab will will be assumed by Olin Chemicals.

Olin Chemicals must consent with the overview and acceptance of spikes and blanks to the contract lab or the EPA can not be assured of QA/QC and will not accept the sample analysis data.

If there are any questions or comments on the overview of the Basin Study or acceptance of the spikes and blanks, please call me at (404) 347-2643.

Sincerely,

John A. Trudell III

John A. Trudell III, SPM
Olin Chemicals Site, McIntosh

cc: Ms. Toni B. Odom, Olin Chemicals, McIntosh
Mr. Charles Till, EPAESD

ATTACHMENT 4

RECEIVED
MAR 3 1 1988
A. L. FELDMAN

BCM Eastern Inc.
Engineers, Planners and Scientists

One Plymouth Meeting • Plymouth Meeting, PA 19462 • Phone: (215) 825-3800

March 29, 1988

Olin Chemicals
P. O. Box 248
Charleston, TN 37310

3 8 0146

Attn: Arnold L. Feldman

Dear Sir:

Enclosed within the report are the results and data for the samples submitted by Olin Corporation personnel to BCM Laboratory.

Sampling was conducted at the McIntosh, Alabama plant for both organic and inorganic analysis. Each instance of sampling was given a unique numerical identification by the field sampling personnel. A sampling is defined as any sample taken, even two separate aliquot from the same location with different matrix modifications were uniquely numbered.

The samples were received at the Laboratory on December 8, 1987, December 10, 1987, December 11, 1987, and December 12, 1987 by BCM's Sample Controller. The samples were of two different matrixes, aqueous and sediment or semi-solid. Each sample was logged into the Laboratory's sample and data management system assigning a unique BCM sample I.D. number to each sample referencing the client I.D. number. The samples for Login were selected from the shipments based upon chain-of-custodies and instructions shipped with the samples and verbal communications via telephone from field sampling personnel for discrepancies.

Methods used can be referenced in "Standard Methods for the Examination of Water and Wastewater" 16th Edition, 1985, USEPA SW-846 "Test Methods for Evaluating Solid Waste Physical/ Chemical Methods" September 1986; referencing SW-846 "Test Methods for Evaluating Solid Waste Physical/Chemical Methods" March 1982. The particular methods are listed below:

DESCRIPTION	METHOD NUMBER
Mercury in Sediment and Water	EPA#7471 or EPA#245.1
Gas Chromatography/Mass Spectrometry for Semivolatile Organics	EPA# 8270
pH Water	EPA# 9040
pH Soil	EPA# 9045
EP Toxicity Extraction	SW-846 Chapter 7 Sec. 4
Total, Fixed & Volatile Solids in Solid and Semi-Solid	Std. Methods 209F
Specific Gravity	Std. Methods 213E

BCM

No real difficulties were encountered during the analysis. The results of all the sediment samples are in a dry weight basis on our tabular result sheets. The only difficulty was sample A30505 was not analyzed for semivolatiles because the only aliquot received contained HNO3 as a preservative.

The sample locations on which matrix quality control was performed are listed below:

OLIN LOCATION NUMBER	BCM I.D. NUMBER
Duplicate of 702	A30553
Spike of 702	A30554
Duplicate of 810	A30555
Spike of 810	A30556
Duplicate or 112	A30545
Spike of 112	A30546
Duplicate of 136	A30547
Spike of 136	A30548
Duplicate of 267	A30528
Spike of 267	A30529
Duplicate of 577	A30509
Spike of 577	A30510
Duplicate of 312	A30406
Spike of 312	A30400
Duplicate of 672	A30416
Spike of 492	A30398
Duplicate of 150	A30402
Spike of 150	A30401
Spike of 451	A30404

Results of Spike and Duplicate analysis can be found summarized in the body of the report. For Mercury, the results are on sheets titled "BCM Laboratory Duplicate Sample Analysis" and "BCM Laboratory Spike Sample Analysis" and for organics on forms titled "Water Semivolatile Matrix Spike/Matrix Spike Duplicate Recovery" and "Soil Semivolatile Matrix Spike/Matrix Spike Duplicate Recovery". All recoveries were within specifications.

Upon the request of Olin (see attached conversation record) after initial results were reviewed, samples were reanalyzed. One of the samples, BCM number A30499, Olin I.D. 807 was reanalyzed for Semivolatiles. The reanalysis (BCM Number 801099) showed lower results which were significantly different. This can only be attributed to non-homogenous matrix and holding times.

Should you have any questions, please do not hesitate to contact me or my staff.

Respectfully,

John J. Tobin Jr.
Operations Manager

/dmj

BCM

Telephone Conversation Record 3 8 0148

Client: Olin Chemical McIntosh Job No: _____

Name: _____ Date: 1/14/88

Spoke To: Arnie Feldman Phone No: _____

Subject: 12/87 Samples

Type Call: Incoming ☒ Outgoing ☐

NOTES:

After Reviewing preliminary data on the above samples, Arnie Requested the following:

Re-analyze Sample 807 for Organics
Analyze Samples 308, 782, 237, 384 for the Entire Sediment Scan (Hg, Organics, Sp. Cond, % Moisture)

I informed Arnie that these Samples have exceeded holding times. He understands but wants us to Run them just the Same.

ATTACHMENT 5

RECEIVED
APR 15 1988
A. L. FELDMAN

OLIN CORPORATION
QUALITY ASSURANCE REPORT
McINTOSH ALABAMA BASIN

LABORATORY - FACILITIES AUDIT

3 8 0150

I. SUMMARY

A quality assurance audit of laboratory facilities was performed as part of the Investigation of the McIntosh Alabama Olin Basin site. The results of this review of laboratory facilities are described below.

II. LABORATORY AND FACILITIES AUDIT

A laboratory and facilities audit of BCM Laboratories (Plymouth Meeting, Pennsylvania) was conducted by Olin personnel (QA Project Specialist and Project Manager) on December 11, 1987. The laboratory director, laboratory manager and client services coordinator were present from BCM Laboratories. Several of the staff members who performed the actual analyses were also interviewed. The facilities and equipment were evaluated during a tour of the laboratories. Supporting information (i.e., on-site laboratory evaluation sheets, resumés and corporate qualifications) submitted during the audit remain on file.

In general, the laboratory facilities at BCM Laboratories appear to be adequately staffed and sufficiently equipped for the types of analysis being performed (i.e., mercury and GC/MS). Responses of several staff members during the audit indicate that these personnel are aware of the quality assurance requirements for this project.

cc: J. C. Brown
D. L. Cummings
[redacted]

LMM/jmm
3/9/88
099
Revised 4/12/88

3 8 0151

APPENDIX 1
STUDY PLAN AND INVESTIGATION

STUDY PLAN AND INVESTIGATION
OLIN CORPORATION
MCINTOSH, ALABAMA

OLIN BASIN

Approvals

Project Manager: _____
A. L. Feldman

Quality Assurance Officer: _____
J. C. Brown

Manager, S.E. Regional Environmental Affairs: _____
D. R. Vaughn

TABLE OF CONTENTS

SECTION I

INTRODUCTION

The purpose of this plan is to conduct a study of potential releases of hazardous constituents to the Olin Basin to satisfy the requirements of 40 CFR 264.101 of RCRA and to provide Remedial Investigation information for CERCLA in response to the Final Forward Study Report, June 6, 1986 (Document Control #268-WPI-RT-CUZY-1).

This document presents the sampling plan, guidelines, specifications and quality assurance program which describe the Study Plan and Investigation of the Basin at Olin Corporation's McIntosh Alabama facility. The level of quality assurance, i.e., the number of blanks, spikes and replicates meets or exceeds the requirements of the EPA's Contract Laboratory Program.

The work requires the sampling and analysis of the surface water and sediments within the Olin Basin. These activities can be divided into five groups:

1) Sampling of Sediments
2) Sampling of Surface Water
3) Analysis of Samples
4) Laboratory Quality Assurance/Quality Control
5) Report Preparation

SECTION II

PROJECT RESPONSIBILITY

PROJECT MANAGER (PM):

Responsible for total project management including:

- Overall responsibility for management of the analytical program and the validity of all data.

- Selecting and reviewing all analytical protocols required for measuring and monitoring.

- Selection of analytical laboratory.

- Directing the activities of internal and external analytical laboratories used for project.

- Reviewing all QA/QC results with QA officer.

- Directing the field sampling.

- Preparing all reports and recommendations.

FIELD PROJECT OFFICER (FPO)

The following are included in this function:

- Assumes responsibility of Project Manager in field during absence of Project Manager.

- Responsible for Safety, Health and Security of Field Sampling Team.

- Responsible for training of Field Sampling Team.

- Responsible for reviewing and advising on all aspects of field QA/QC.

- Assisting in specifying field QA/QC procedures to be used during the program.

- Responsible for evaluating and recommending corrections to field sample custody procedures.

- Responsible for evaluating and recommending corrections in field sampling and/or field analytical techniques.

- Verifying that field analytical QC procedures are being followed as specified in the QA/QC program.

- Participating in the field analytical/sampling audits.

SAMPLING COORDINATOR (SC)

Responsible for coordinating field activities and delivery of samples to the Analytical Laboratory.

- Determining appropriate sampling equipment and sample containers to minimize contamination.

- Training and qualifying field personnel in sampling procedures and field analytical procedures, prior to taking samples.

- Ensuring that samples are collected, labeled, preserved, stored, and transported as specified in the Study Plan.

- Checking that all sample documentation (labels, field notebooks, chain-of-custody records, packing lists) is correct and transmitting that information with the samples to the Analytical Laboratory.

- Verifying that field analytical QC procedures are being followed as specified in the QA/QC plan and preparing field QC data for review by Project Manager.

- Participating in field analytical/sampling quality audits.

QUALITY ASSURANCE OFFICER (QAO)

- Responsible for reviewing and advising on all aspects of QA/QC.

- Assisting the Project Manager in specifying QA/QC procedures to be used during the program.

- Making external and internal QC evaluations and reviewing QA/QC procedures and if problems are detected, making recommendations to the Project Manager, or Contract Laboratory Coordinator concerning repeat samples and analyses and/or procedure changes.

- Responsible for evaluating and recommending corrections to sample custody procedures.

- Responsible for informing the Project Manager that appropriate QA/QC procedures have been established and are being implemented by the Sampling Coordinator and Contract Laboratory Coordinator.

- Responsible for evaluating and recommending corrections in sampling and/or analytical techniques.

- Responsible for evaluating validity of finished data and reporting the results of the evaluation to the Project Manager.

ANALYTICAL LABORATORY COORDINATOR (ALC)

- Responsible for selecting Contract Laboratory based upon recommendations of Project Manager, Field Project Officer and Quality Assurance Officer.

- Responsible for obtaining contract with outside laboratory.

- Acts as interface between Project Manager and Contract Laboratory Coordinator.

- Responsible for timely function of contract laboratory in meeting laboratory milestones.

CONTRACT LABORATORY COORDINATOR (CLC)

Responsible for the contract laboratory's analytical activities. These include:

- Training and qualifying personnel in specified laboratory QC and analytical procedures, prior to receiving samples.

- Verifying that laboratory QC and analytical procedures are being followed as specified in the specific QA plan and reviewing sample and QC data. This review will include examination of raw data such as chromatograms and checking of arithmetic calculations of the samples analyzed, as well as inspection of reducted data, calibration curves and bound laboratory notebooks.

- Informing the Project Manager and/or QA officer if the review indicates a decline in data quality that appears to warrant repeat analysis of some or all samples.

- Receiving samples from the field and verifying that incoming samples correspond to the packing list or chain-of custody sheet.

- Maintaining records of all incoming samples, tracking those samples through subsequent processing, analysis, and ultimately appropriate disposal of those samples at the conclusion of the program.

- Preparing quality control samples for analysis prior to and during the program.

- Preparing QC and sample data for review by the Project Manager and QAO.

- Review of raw data with laboratory chemist, against calibration and QC records.

- Approval of finished data as meeting the quality objectives of the project.

- Preparing QC and sample data for transmission to the Project Manager.

- Preparing and shipping sample shuttles to Field Project Officer. Shuttles to include all containers, labels, seals, trip blanks and ice packs as specified on the Site Investigation Plan.

SECTION III

SAMPLE LOCATIONS

I. WATER

Sample Basin surface water at eight locations as shown on Olin Drawing No. SKD-10-10-38. The locations, described below, were selected on the basis of:

(1) Relationship to Basin discharge

(2) Relationship to original effluent ditch location

(3) Overall coverage of Basin

A. Current effluent ditch below Basin discharge including current effluent and basin discharge.

B. Old effluent ditch into Basin

C. North shallow area adjacent to old effluent ditch into Basin

D. South shallow area adjacent to old effluent ditch into Basin

E. North Basin area

F. East Basin area

G. North and South deep areas

II. SEDIMENT

Sample for sediment at ten locations as shown on Olin Drawing No. SKD-10-10-39. The locations, described below, were selected on the basis of:

(1) Relationship to Basin discharge

(2) Relationship to original effluent ditch location

(3) Relationship to possible sediment deposition

(4) Overall coverage of Basin

A. Current effluent ditch below Basin discharge including current effluent and Basin discharge.

B. Old effluent ditch into Basin

C. North shallow area adjacent to old effluent ditch into Basin

D. South shallow area adjacent to old effluent ditch into Basin

E. North Basin area

F. East Basin area

G. North and South deep water areas

H. North grass area adjacent to old effluent ditch into Basin

I. South grass area adjacent to old effluent ditch into Basin

III. GENERAL

As stated above, the eight Basin water sample locations will also be sampled for sediment. To minimize disturbance to these sample locations, the following procedure will be followed:

1) Measure depth of water
2) Take water sample(s) - see Sampling Methodology Section (Section VI)
3) Mark sampling point with buoy
4) Wait minimum of 24 hours
5) Take sediment samples - see Sampling Methodology Section (Section VI)

Specific sampling points for deep water, North Basin and East Basin will be selected in the field predicated on water depth, sediment depth and field accessibility. Actual sampling location could vary by ±300 feet from that shown on Olin Drawing SKD-10-10-38 and SKD 10-10-39.

Actual sampling points will be marked on Topographic Map which will be submitted with the final report (see Investigation Report Section IX).

SECTION IV

PARAMETERS

Olin has selected five parameters that all samples will be analyzed for. They are as follows:

1) Mercury
2) 1,2-Dichlorobenzene (orthodichlorobenzene)
3) 1,4-Dichlorobenzene (paradichlorobenzene)
4) Hexachlorobenzene (HCB)
5) Pentachloronitrobenzene (PCNB)

Water samples will be analyzed for total mercury while sediment samples will be analyzed for total and EP extractable mercury.

Mercury

Mercury was selected as a parameter for two reasons: Olin operated a Mercury Cell Chlorine/Caustic Soda plant at McIntosh from 1952 through 1982, and Olin discharged the NPDES wastewater from the Mercury Cell plant into the Basin until 1976.

1,2 and 1,4 - Dichlorobenzene

1,2 and 1,4 - Dichlorobenzene (the ortho and para isomers) were selected as parameters because they were a by-product of the Crop Protection Chemical (CPC) facility at McIntosh.

Hexachlorobenzene

Hexachlorobenzene was selected because it was a by-product of the CPC facility at McIntosh. Blocks of Hexachlorobenzene were used for erosion control on the edges of the main East-West ditch and in the effluent ditch approximately ½ mile east of the main plant. Both ditches are part of the NPDES effluent system. All hexachlorobenzene in these ditches was removed in 1977.

Pentachloronitrobenzene

From 1956 until 1982, one of the main products of the CPC facility was Pentachloronitrobenzene. As a condition of NPDES permit (No. AL0001945), Olin was required to sample, analyze and report on the discharge when the facility was operating.

SECTION V

DOCUMENTATION

Olin will meet or exceed the documentation requirements for the sampling and analysis of the Basin as specified in: 1) Test Methods for Evaluating Solid Waste, SW-846, 2) Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, QAMS - 005/80, and 3) Standard Operating Procedures and Quality Assurance Manual - USEPA, Region IV, Engineering Support Branch, April 1, 1986.

Specifically, Olin's program consists of three parts: (1) Field Log Book, (2) Sample Seals and Labels and (3) Chain-of-Custody Records.

Field Log Book

A Field Log Book (hard cover) with prenumbered pages will be kept to record all information pertinent to the sampling. At a minimum, the following will be entered:

1) Date
2) Observable weather conditions (sunny, cloudy, etc.)
3) Observable Basin condition (clear, muddy, etc.)
4) Sampling team members names
5) Sample location
6) Sample type (water, sediment)
7) Water depth, temperature, pH
8) Description of sampling point
9) Time sample collected

10) Sample number

11) Number and volume of samples taken

12) Sampling methodology

13) Field Preservation, if any

14) Sample distribution and how transported

15) Signatures of sampling team members

In addition, records of conversation, if any, between Olin and the analytical laboratory will be documented in the Field Log Book.

Sample Seals and Labels

To prevent misidentification of samples, self-sticking vinyl labels will be supplied by the laboratory which will include the following information:

1) Sample number

2) Sample identification

3) Sample type

4) Name of collector

5) Date and time of collection

6) Place of collection

7) Sample Preservation Information

8) Analysis required

9) "Olin Corporation, McIntosh, Alabama"

After sampling, the labels will be affixed to the sample bottles in the field.

After sample collection, each bottle will be sealed in such a way that it is necessary to break the seal to open the sample container. The seal will be a signed custody seal that will contain at least the sample number, date, time, location and name of collector.

Chain-of-Custody Records

To establish and maintain the documentation necessary to trace sample possession from the time of collection through analysis, a Chain-of-Custody Record will be filled out and accompany every sample. Olin-McIntosh will use its standard Chain-of-Custody Record form which is attached in Section XI. Completed copies of the record will be requested from the analytical laboratory to accompany their final report. The completed Chain-of-Custody records will then be appended to the Field Log Book. The "Remarks" section on the chain-of-custody will specify the analyses to be performed on each sample.

SECTION VI

SAMPLING METHODOLOGY

Detailed below are the specific sampling methodologies and sample preservations that will be used to collect the water and sediment samples. All samples will be split in the field (including the field blanks) to insure delivery of an undisturbed sample in case of sample bottle breakage during transportation to the laboratory. Only one of each sample will be analyzed. It is estimated that the water samples can be taken in 1-2 days depending upon weather conditions and accessibility and that the sediment samples can be taken in 2-3 days.

Water Sampling

1) Measure depth of water using weighted measuring tape, measuring pole or similar device.

2) Measure pH of water using Method 150.1 from Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, (copy attached in Section XI).

3) Measure temperature of water using Method 170.1 from Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, (copy attached in Section XI).

4) A depth integrated water sample will be taken using the Weighted Bottle (Test Methods for Evaluating Solid Waste, SW-846, Third Edition, page NINE-50). Vertical subsamples will be composited to form a single sample. The number of vertical sub-samples and the depths at which sub-samples will be taken will be at the discretion of the Sampling Coordinator.

Sediment Sampling

1) Measure temperature of water using Method 170.1 from Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, (copy attached in Section XI).

2) Measure pH of water using Method 150.1 from Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, (copy attached in Section XI).

3) A Phleger corer, Ponar dredge or similar device will be used to obtain a 0-6" sediment sample.

4) The sediment sampling device will be:

   a) Precleaned pursuant to Cleaning Procedures for Stainless Steel and Metal Sampling Equipment (Standard Operating Procedures and Quality Assurance Manual, Appendix B.4).

   b) Cleaned between samples pursuant to Field Equipment Cleaning Procedures (Standard Operating Procedures and Quality Assurance Manual, Appendix B.8.3).

Sample Preservation and Collection

Sample bottles and preservation of individual samples will be pursuant to the requirements for each parameter's specific methodology in Test Methods for Evaluating Solid Waste, SW-846, USEPA. Briefly these are:

1) Mercury - Water: Sampled and stored in polyethylene containers with polyethylene cap. Samples will be acidified to a pH of less than 2.0 with 70% ACS reagent grade nitric acid. Samples will be iced or refrigerated from the time of sampling until analysis. Samples will be analyzed within 38 days of collection.

2) Mercury - Sediment: Samples stored in glass containers with teflon-lined caps. Samples will be iced or refrigerated from the time of sampling until analysis. Samples will be analyzed within 40 days of collection. Samples will be dried in an oven at a temperature of 60°C.

3) Ortho and para dichlorobenzene, pentachloronitrobenzene and hexachlorobenzene - Water and Sediment: Samples will be taken in glass containers with Teflon-lined screw caps. Samples will be iced or refrigerated at 4°C from the time of sampling until extraction. Samples will be extracted within 7 days of collection and analyzed within 40 days of extraction.

SECTION VII

ANALYTICAL METHODOLOGY

An outside contract laboratory will be selected by Olin to analyze the samples based on the laboratory's overall analytical capability, capability to analyze for the required parameters and familiarity with Olin-McIntosh samples. The laboratory will be required to follow (and document to Olin) all USEPA procedures under the contractor laboratory program, USEPA Region IV SOPQAM and USEPA procedures for the specified methodologies. The laboratory will be required to supply Olin with all sampling bottles, shuttles and trip blanks. The laboratory will also supply Olin (under separate cover) the water to be used for the field blanks. The laboratory will assure proper precleaning of sample bottles and laboratory equipment prior to usage.

All analysis will be performed pursuant to:

1) Test Methods for Evaluating Solid Waste, SW-846, USEPA, November 1986, Third Edition - hereafter referred to as "SW-846" or,

2) Standard Methods for the Examination of Water and Wastewater, Sixteenth Edition, 1985, American Public Health Association - hereafter referred to as "Standard Methods" or,

3) 40 CFR 261 Appendix II - EP Toxicity Test Procedure (Revised 46 FR 35247, July 7, 1981) hereafter referred to as "EP Extract"

All sediment samples will be homogenized and split at the laboratory. One split will be run for the specified chemical analysis detailed below and the second split will be run for Percent Moisture and Specific Gravity. The Standard Methods will be used for Moisture and Specific Gravity utilizing Method 209A, "Total Solids Dried at 103-105°C" (pg. 93) and Method 213E, "Specific Gravity" (pg. 132) respectively or equivalent methods approved by Olin: copies of the methods are attached in Section XI. Results of all sediment samples will be reported on a dry weight basis.

Water samples for mercury will be analyzed using SW-846 Method 7470 (attached Section XI). Sediment samples for mercury will be run using SW-846 Method 7471 (attached Section XI) for total mercury and EP Extract for leachable mercury.

Analysis for ortho and para dichlorobenzene, hexachlorobenzene and pentachloronitorbenzene will be done using SW-846 Method 8250 GC/MS Method for Semivolatile Organics: Packed Column Technique (attached Section XI) or equivalent USEPA method approved by Olin prior to use.

SECTION VIII

QUALITY ASSURANCE/QUALITY CONTROL

QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES

The overall objective of the Quality Assurance/Quality Control (QA/QC) Program is to insure that the analytical results are reliable, reproducible, and accurate. To this end, a series of specific objectives for each step of handling, preparing, analyzing, and documenting the samples collected for this project has been established. The basis of the quality assurance program is the establishment of methods to be followed in producing an analytical result for a sample.

All data will be reported in consistent units to allow comparison with similar data. Quality assurance samples, replicates, spikes, and standards calibration will be used to validate the method in the laboratory. Changes in methods will be reported with reasons and QA/QC results suitable to support the change; this will include, when appropriate, verification or validation data.

Analytical methods frequently prescribe specific quality assurance procedures for the method. Where the procedures of the method conflict with the procedures in this manual, the more stringent procedures will control.

Table I (end of Section VIII) presents the Summary of Precision, Accuracy and Completeness Objectives.

Accuracy is defined as the degree of agreement of a measurement or average of measurements with an accepted reference or true value, for the execution of a method in a particular laboratory using an interference-free matrix. In general, accuracy goals for this project determine errors due to instrument response and incomplete preparation recoveries can be corrected for, and so that the primary uncertainties in the analytical data are due to random errors not exceeding those appearing in the reference in Table 1. For this project, the QA objectives for accuracy are expressed in terms of the following parameters:

- Reference Materials: All reference materials used as calibration standards or surrogate compounds will be the highest purity commercially available (usually greater than 98%) and must be certified by the supplier. The standards will be cross-referenced to appropriate EPA EMSL standards, where available.

- Instrument Performance: Each instrument used in this project will be checked on each day that samples are analyzed to demonstrate performance. One of the QA objectives is that the absolute instrument response [e.g. area counts/ng injected for the standard(s)] shall be within 20% of the last day's calibration and 50% of the value of the initial calibration provided that the precision of the measurement meets the QA/QC criteria.

- Recovery of Compounds: Recovery is the degree of agreement of a measurement or average of measurements of field samples to which a known amount of analyte has been added (this should be added at the level specified in the method) compared to the sum of the measurement of the

analyte in the field sample before addition and the amount of analyte added. The recovery of the analytes or interest will be defined as follows:

$$\text{Recovery},\% = \frac{(\text{ug found in spiked sample} - \text{ug in native sample}) \times 100}{\text{ug added to sample}}$$

The specified numerical targets for recovery of the analytes are given in the reference in Table 1.

Precision is defined as a measure of mutual agreement among individual measurements of the sample property. A final QA objective is that the results of the analysis of spiked levels of the analytes in laboratory replicate sample be within the limits specified in the reference on Table I, when replicate spiked samples are analyzed.

Completeness is a measure of the amount of valid data obtained from a measurements system compared to the amount that was expected to be obtained under correct normal conditions. This QA objective is defined in Table I.

The sampling will be performed so as to best obtain a true picture (representation) of the basin. Some of the factors that are addressed by the included protocol are mixing of samples and sample preservation.

Sample site selection and sampling procedures and equipment are addressed in the Sample Location Section (Section III).

Concentration data will be reported in mg, ug, or ng or analyte per liter for water and per kilogram for sediments of original sample. pH will be reported to nearest 0.1 pH unit. When precise recovery values for a given component are known, the recovery information will also be provided.

Full documentation of the analyses performed will be kept in notebooks, including traceability of standards. These notebooks will be available for inspection at the contract laboratory and for field notes at Olin Corporation, Charleston, Tennessee.

FIELD & TRIP BLANKS

The outside laboratory will be required to supply a trip blank (split to insure sample integrity) in each sample shuttle supplied to Olin. Olin will supply a field blank (split to insure sample integrity) in each sample shuttle returned to the laboratory. The blanks will be run for total mercury, ortho and para dichlorobenzene, hexachlorobenzene and pentachloronitrobenzene using the methods specified in the Analytical Methodology Section.

BLIND REPLICATES

Two blind field replicates for water and two field blind replicates for sediment (all split to insure sample integrity) will also be sent to the laboratory for the specified parameters. This represents approximately a 20% replicate analysis. These replicates will be split from field samples by the field sampling team.

SPIKE RECOVERIES

The contract laboratory will spike all samples with a surrogate standard. Percent recoveries will be calculated and reported for all samples. This is a 100% spike recovery quality control check.

Laboratory split samples from two water and two sediment samples will also be spiked and recovery of total mercury determined. The splits will utilize analytical methodology, SW-846 Method 7470 and 7471 for water and sediment respectively. This represents approximately a 20% spike and recovery.

CONTRACT LABORATORY QA/QC

The outside laboratory will be required to supply Olin with their QA/QC program that at a minimum meets the Contract Laboratory Program, SW-846, Method 7470, Method 7471 and Method 8250 requirements. The laboratory will also supply Olin with their minimum detection levels that at least meet EPA Laboratory Guidelines for all parameters and surrogates.

In addition, the laboratory will supply Olin with their QA/QC data and results for the days that analysis of Olin samples are run. This will include all gas chromatograms of Olin samples, replicates, blanks, spikes and the daily laboratory QA/QC data.

CALIBRATION PROCEDURES AND FREQUENCY

See Analytical Procedures for the details of instrumental calibration.

- The calibration curve for all organic analyses will comprise five standards.

  If any calibration point varies by more than 20% from the last day's calibration or 50% from the initial calibration curve, corrective action(s) will be taken, i.e., electronic repair, new calibration, spectrometer retuned, GC column change, etc.

- Calibration procedures for all other parameters will be those specified by the method reference.

- Field instruments will be calibrated daily according to the procedure specified by the reference method.

DATA VALIDATION

The principal steps that will be used to verify the data integrity during collection and reporting of data are:

- Raw data generated by the laboratory chemist will be reviewed with the Laboratory Supervisor/CLC. Raw data will be reviewed against calibration and QC records to ensure the adequacy of documentation and the reliability of the data. These reviews will take place on not less than a weekly

basis. The raw data will be considered finished data when the review has been successfully completed. The finished data and QC data will be reported to the PM.

- The QAO will review finished data to ensure that QA/QC requirements have been met. These reviews will be performed on a random basis in conjunction with the PM and CLC/Laboratory Supervisor. The QAO will report the conclusions of the review to the PM. The data will be considered validated when the review has been successfully completed. The QAO report will be included with the report of the data.

- The PM will consider all finished and validated data. Invalid data will be flagged and will not be reported by the Project Manager. The fact that data has been invalidated and the reasons will be reported and maintained by the Project Manager.

- PM, CLC and laboratory supervisor may request additional confirmation, if deemed necessary for site specific indicators.

All results will be reported by the CLC to the Project Manager who will then forward the data to the appropriate parties. The reporting format will be as specified in EPA Contract Laboratory Program guidance.

The raw data will be calculated by the appropriate analytical chemist in the laboratory and the finished data will be reviewed and supplied by CLC to the PM.

All data generated will be included in written reports of the program. The storage of these reports will be the responsibility of the PM.

The storage of all laboratory notes and chromatograms in accessible forms will be the responsibility of the contract laboratory coordinator.

CONTRACT LABORATORY AUDIT

At least one performance audit will be made of the contract laboratory during the life of the project. The audit will be performed by the Project Manager and/or the Quality Assurance Officer. The audit will be done to ensure that the laboratory is meeting the minimum requirements of the Contract Laboratory Program and the requirements of this plan.

TABLE I

SUMMARY OF PRECISION, ACCURACY AND COMPLETENESS OBJECTIVES

Measurement Parameter	Method Reference	Exp. Conditions	Precision Standard Deviation	Accuracy	Completeness
Temperature (Field)	EPA 170.1	Water	as per reference	as per reference	95
pH(Field)	EPA 150.1	Water	as per reference	as per reference	95
Semi-Volatile Organics	EPA 8250 SW 846	Water & Sediments	as per reference as per reference	as per reference as per reference	90
Moisture (Total Solids)	EPA 209A	Sediments	as per reference	as per reference	95
Specific Gravity	EPA 213E	Sediments	as per reference	as per reference	95
Mercury	Method 7470 SW 846	Water	as per reference	as per reference	90
Mercury	Method 7471 SW 846	Sediments	as per reference	as per reference	90
Mercury (EP Extract)	Appendix II 40 CFR 261	Sediments	as per reference	as per reference	90

38 01183

SECTION IX

INVESTIGATION REPORT

Olin will prepare and submit a report to the USEPA on the investigation within 8 weeks of receipt and review of the analytical data. The report will include: a summary of the sampling program including any significant field notes and a map showing the exact sampling locations; complete analytical results including QA/QC data; an evaluation of the analytical results; and conclusions based upon the investigatory program. The conclusions will include recommendation for any further work.

ALF/wsr
010/ALF5

SECTION X

REFERENCES

1. Test Methods for Evaluating Solid Waste, SW-846, USEPA, November 1986, Third Edition.

2. Standard Methods for the Examination of Water and Wastewater, Sixteenth Edition, 1985, American Public Health Association.

3. 40 CFR 261 Appendix II - EP Toxicity Test Procedure, Revised 46 FR 35247, July 7, 1981.

4. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plansk QAMS - 005/80, December 1980, USEPA.

5. Standard Operating Procedures and Quality Assurance Manual, April 1986, USEPA, Region IV.

6. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1979, USEPA.

010/ALF5
8/07/87

APPENDIX 2
FIELD SAMPLING NOTES

3 8 0187

Field Book

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Environmental Affairs Dpt
Address P.O. Box 248
Charleston TN 37310
Telephone 615-336-4000

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McIntosh Basin
Sampling Program

Date. December 8, 1987

Reference. Study Plan and Investigation, Olin Corporation, McIntosh N.A. - Olin Basin dated October 1987.

1. Water samples will be collected on Dec 8. Sediment samples will be collected on Dec 9 after completion of all water sampling.

Eight water samples will be taken as designated by Plan

pH/temperature meter calibrated in lab, calibration check in field.

2 ⓒ Date December 8, 1987 0840hr

Sample No WD

Water Depth 0.85 ft

at O.S.D. Temp 19°
pH 7.6°

ⓑ Weather Cloudy light breeze from East, Temp 59°F

ⓐ Basin - slightly muddy due to rain last night of Dec 7.

ⓓ Sampling Team - KD Roberts
SE Anderson, RJ Cheek
Observers: T. Dolan (A/E), C.T. Ill (EPA), J. Trudell (EPA)

ⓔ Location: #75 feet from bank
500 feet from Boat Launch

ⓕ Type Water

Sample No. 402 org
737 org
325 Hg
349 Hg
Water (org) Collected at 0840 hr

2L for organics
2 - 250 ml for Hg

Sampled per plan procedures (grab sample)

Preservation - Iced
Hg sampled preserved w/ HNO_3 to pH < 2

All samples sent to BCM

Sample Pt. located NW of discharge ditch 200 ft from bank. Water shallow

Kenneth D Roberts

4 1 Sample Point WC 8 Dec 87

3 8 0190

Water Depth 1.6 ft
@ 0.5D
ph - 7.7
Temp - ~~6.6~~ °C OR 17.0 °C

Weather light rain
overcast
light wind

Basin - Slightly Turbid
brownish color

Team - KD Roberts
SR Anderson
RT Check

Observers: T Odom
C. Tills
I. Truden

Location: WC located on western portion of main effluent outfall

Type: Water

Type - Water

Time Collected org - 0005 hrs
Hg - 1010 hrs

Sample No. 869 org
279 org EPA
362 org ~~EPA~~
107 Hg
263 Hg EPA
925 Hg ~~EPA~~

Hg samples preserved with HNO_3
All samples iced
1 l org to EPA
1-250 ml Hg to EPA
remainder to BCM
(2 l for Organics)
(2-250 ml for Hg)

Look at the shallow for Wt. Bottle
sample. Did not take at
0.5D

Kathy D Roberts

5 | Date Dec 6, 1987 ~~10 hr~~ 1125 hr

Water Depth - 9.5 feet

Depth	pH	Temp
1.0	7.6	17
2.0	7.6	17
3.0	7.6	17
4.0	7.6	17
5.0	7.6	17
6.0	7.6	17
7.0	7.6	17
8.0	7.6	17
9.0	7.6	17

Weather - Overcast
Light Rain to No rain
Light Wind.

Team - Roberts, Anderson Chuck
Obs. Adam (Okla), Till + Frankel (EPA)

Sample Type - Water

Sampling Depth
2l from 0.33D
= 3.2 ft

2l from 6.4 ft (0.67D)
Collected with the weighted 3-Bottle Sampler
Composited to form sample

Time 1130 am.

Sample No 560 1l org
3141 " "
523 ½l Hg
442 ½l Hg

Hg samples preserved with HNO_3 (pH < 2)
All samples iced.
Site # WE

Sed located in NE corner of Basin near Control Point

Keith Plotz

5 Dec 87 12:00 hr

3 8 0192

Site # W-GN

Water Depth 26.7 ft

Weather cool 60°F
overcast
light wind

Basin slightly turbid

Team Roberts, Anderson,
Cheek
Observ. [illegible]
Till (EPA), Tridell (EPA)

Sample Type: Water

Pt for Basin Spl Site located in North central part of Basin. Water in this section is deep.

Depth	pH	Temp
2.0	7.4	18
4.0	7.5	18
6.0	7.5	18
8.0	7.5	18
10.0	7.5	18
12.0	7.5	18
14.0	7.5	18
16.0	7.5	19
18.0	7.5	19
20.0	7.5	19
22.0	7.5	19

~~24.0~~ end of cord.
~~26.0~~

Sampling Depths for water 1205 hr. collection

0.2 D	5.3 depth	
0.4 D	10.6	"
0.6 D	15.9	"
0.8 D	21.2	"

1 liter from each depth Composited and split into
2 l for Organics
2-250 ml for Hg

1-0 1

L Gn (mt) 3 8 0193 Sample Pt WA 11

Sample No. 509 org 1ℓ
451 org 1ℓ
406 Hg ¼ℓ
312 Hg ¼ℓ

all samples To BCM

Samples collected with Weighted Bottle

Hg samples preserved with ½ HNO3 (pH<2)
All samples iced

8 Dec 87 1315 hr
Location: Discharge Ditch @ 15th St. Weir (Drain)
Depth @ 0.95 ft
@ 0.5D
Temp 22°C
pH 7.0
Type: Water
Time of sampling 1320 hr
4 ℓ collected from 0.5 ft deep
Grab samples - too shallow for Wt. Bottle
Composited and split into

2 ℓ for org
2-250 ml for Hg

Weather Cool 60°F
Overcast
Light wind

Sample No. 420 org 1l
672 org 1l
399 Hg ½l
712 Hg ½l

Water in ditch slightly turbid - probably due to stormwater runoff.

Team - Roberts, Anderson Creek
Obs - Odom(CWA), Till + Trudell (EPA)

Hg samples preserved w/ HNO_3 (pH<2)
All samples placed on ice
All samples sent to BCM

Keith R Roberts

Sample WB
Type - Water
Depth 0.5 ft
pH at 0.5D (0.25ft)
pH = 6.8 Temp 24°C
Collection Time 1350 hrs
Collected 4 l + composited
Collected next to log.
Stream width 4 feet - no flow. (back water from Basin)

Sample # 574 org 1l
424 org 1l
966 Hg ½l
257 Hg ½l

Grab samples - water too shallow for weighted bottle.

8 Dec 73 8 0195 15

Weather Cloudy
Temp 60's

Sample W-G5 1425 hr.
Type - Water
Total Depth 23.0 ft.

Weather Cloudy
Cool 62°F

Desc:
Sp Pt Desc: Sample Pt located in Original Effluent Ditch leading into Basin. Little or no flow in ditch some sections of ditch are almost dry. Sample pt about 600 ft from road

Depth	pH	Temp
2.0	7.6	20
4.0	7.6	20
6.0	7.6	20
8.0	7.6	20
10.0	7.6	20
12.0	7.6	20
14.0	7.6	20
16.0	7.6	20
18.0	7.6	20
20.0	7.6	20.

Basin Water dark due to its depth.

Hg samples preserved with HNO_3 (pH < 2)
All samples iced
All samples sent to BCM

Mark A Roberts

Sample WG5 (cont)

Sample at

0.2D	4.6	1 l
0.4D	9.2	1 l
0.6D	13.8	1 l
0.8D	18.4	1 l

4 l composite (Water) split into:

2 l for org
2 l for Hg.

Sample No.

696	org	1 l
150	org	1 l
221	Hg	¼ l
492	Hg.	¼ l

Hg samples preserved with HNO_3 ($pH < 2$)
All samples placed on ice and sent to BCM

Sampled by Roberts, Robinson, Chalk

Obs: Alom, T.? Trudell
OIM EPA EPA

Spl Pt located in South central portion of Basin ~~Area of Basin is deep~~ (or) waterdepth in this area of the Basin is deep

Sample Collected with Weighted Bottle sampler.

Keith D Roberts

13 8 Dec 87 1500 hr

Sample WF
Type - Water
Water Depth 4.85 ft.

Depth	pH	Temp
1.0	7.7	19
2.0	7.7	19
3.0	7.7	19
4.0	7.7	19

Weather Slight Clear but mostly Cloudy light wind

Basin slightly turbid generally dark!

Sampling Team - Roberts, Andrea Cheek, Odom

Observers - Till, Trawle II (EPA)

Weighted Bottle sampler used. Four liters collected at 2.4 ft (0.5D) Composited into 4l bottle

Split out:

3 8 0197

2 1l for org
2 250ml for Hg

Sample No

777	org	1l
654	org	1l
316	Hg	1/2l
838	Hg	1/2l

Sample pt located located in eastern part of Basin. Closed spl pt to River

Hg samples preserved w/ HNO_3 (pH<2)
All samples iced and sent to BCM

Keith A Roberts

8 Dec 87 1515 hr

Field Blanks

Prepared in the Boat

Sample No.

878	org	1 l
942	org	1 l
283	Hg	½ l
908	Hg	½ l

Weather - Mostly Cloudy 60°
Team - Roberts, Chuck, Anderson
Obs: Allen (Olin); Till + Trudell (EPA)
Type - Water
Water provided by BCM in one gallon plastic containers, carried in field/boat throughout sampling.

Hg samples preserved with HNO_3
All samples iced and sent to Bcm

Keith D Roberts

9 Dec 87

McIntosh Basin Sediment Sampling

Reference: "Study Plan of Investigation - Olin Corp - McIntosh, AL" dated October 1987

Samples farthest from original effluent ditch will be collected first.

pH/Temp meter calibration check with buffer 7 and 10.

3 8 0198

Date: 9 Dec 87

3 8 0199

Weather: Cloudy - Overcast
~60°F, light or no wind

Sol Pt Desc: Sediment with most clay visible
dark in color

Basin: Slightly Turbid

Time 0920

Sample Number: 577 ✓
Quantity 401 ✓
2 samples - 250 ml vol
to BCM

Team: Roberts, Anderson
Check, Odom
observers - C. Till (EPA)

Sampled with power dredge
placed on ice after collection

Location: (S cm W-F)
Eastern part of Basin
320° to dead tree at Round Pond
180° to outfall/building
252° to tree at WC

Type: Sediment

Water Depth 5.1
Temp 18.8
pH 7.15

Kurth D Roberts

9 Dec 87

3 8 0200

Weather Cloudy
60°F
light or no wind

Basin

Team: Roberts, Anderson, Cheek
Odom
Observer - Till

Location: S-G3
South Central Part of Basin
174° to outfall, 226 to tree on W-C
340 to tree at round pond

Type Sediment:

Water Depth ~~29.8~~? 38.5 ft.
temp 19°C to 39 ft
pH 7.43

Spl DH Dec - Appears to be ~ deep hole
Marker has drifted since last night.
Sample location probably within 50 ft of water point.
Sediment: black

Time: 0950

Sample No: 538
507

2 samples collected + sent to GCMS, need immediately after collection
Sediment collected with para dredge, homog + split into two bottles.

Ruth D Roberts

9 Dec 87

Weather Cloudy
60°F
no wind

Baster -

Team Roberts, Anderson
Check
Observers - T. Ill (EPA), Odom

Location S-GN
~~North Central~~ Baster
~ 500 ft from S-C5
217 to tree near W-C
168 to outfall
357 to dead tree near mound pond
~ 500 from dead tree "

Water Depth 24.5 ft.
Temp 20.3
pH 7.42

3 8 0201

Spl Pt Des - Sediment is dark (black)

Time 1015 am

Sample No. 267
919

Sample collected with Ponar dredge, homogenized and split into 2 samples ~250 g each sent to BCM

Keith D Roberts

9 Dec 87

Weather Cloudy
60°F
no wind.

Water Slightly Turbid.

Team Robert Chuck Anderson
Observers Till (EPA), Odom

Location Northwest corner of Basin
42° to dead tree at Round Pond
180° to tree near WC
142° to outfall.
~ 100 ft from shore (west).

Type Sediment

Water Depth 9.5 ft
Temp 20.5 °C
pH 7.46

Sol 3 8 0202
Sediment is black
slightly coarser than other samples (S-E)

Time 1030 am

Sample No. 483
217
343 to EPA

Sample collected with Ponar dredge, homogenized & split into 3 samples
~ 250 g each unit.
2 bottles sent to BCM
1 bottle sent to EPA

Keith D Rhodes

30 1 KDR 9 Dec 87

3 8 0203 3

Weather Mostly Cloudy - Clearing
65°F
no wind

Basin - KDR plant effluent ~~Outfall~~ ditch
- turbid - brownish tan

Team - Roberts Cheek
Anderson
Observers - Till (EPA), Olson
(150-160 ft)

Location 60 paces from outfall
~~mid pt of~~ outfall ditch

S-A

Type: Sediment

Water - Depth 1.5 ft
no pH or temp taken

Sed Pt Des Mid pt of outfall ditch
lots of shell in sample - #
very sandy, light in color

Time 1145

Sample No ~~615~~ KDR 615
537

Sample collected w. Ponar
dredge, large shells removed
sample homogenized & split
into 2 250 ml jars.

2 lb. ice to GCM

Keith D Roberts

32 9 Dec 87

3 8 0204 I

Spl Pt Des Shallow fine sediment (S-D)

Time 1250

Sample No. 907
237

weather 70°F
Partly Cloud
no wind

Basin - shallow area
½ halfway between old out-
fall ditch + plant effluent ditch

Team: Roberts Anderson Chaet
observers - Till (EPA), Odom

Sample collected with Ponar dredge, large shells removed, sample homogenized + split into 2 250g samples - sent to BCM

location - ~100 ft from shore
144° to outfall
340° to dead tree at road pond
286° to W.C

Sediment very fine in this area
- will support a person weight
- large number shells
- sampling repeated three times with dredge.

type: Sediment

Water Depth 1.2 ft
temp - 21.3°
pH - 8.28

Kristi D Roberts

34

9 Dec 87

weather - 20°C
Partly Cloudy
No Wind

Basin - Shallow
1/2 way between old outfall ditch & western shore.

Team Roberts, Anderson Clark

Obs: Till (EPA) Odor

Location (S-C)
18° to dead tree at Round Pond
~135° to outfall

Type - Sediment

Water Depth 1.8 ft
Temp 26.0 °C
pH 7.56

38 0205

35

Sta/Pt Des Shallow
Firm sediment (less firm than S-D)
Required 2 sonar throws
80% black, 20% lighter, some sand.

Time: 1315 hrs

Sample No 790
782

Sample collected with Ponar dredge, (no shells), homogenized and split into 2 250g samples.
Samples sent to BCM

Robert D Roberts

38 9 Dec 87

3 8 0206

Weather 70°F Humid
Partly Cloudy
no wind

Spl Pt Des no standing water
26" above water surface
high clay content

Basin - Sample located in low dense vegetation west of outfall ditch

Time : 1335

Sample No 183
532

Team: Roberts, Anderson Cheek
observers: Till (EPA), Odom

Sample collected with stainless steel spoons, homogenized, vegetation removed, and split into 2 250 g

Location S-H
150 ft from Basin (drop)
25 ft from effluent ditch

Vegetation removed from surface of basin before sampling.

Type Sediment

Water Depth 0

Ruth D Roberts

38 9 Dec 87 3

Weather 70°F Humid
Partly cloudy
no wind

Basin Sampled in low area
vegetation east of outfall ditch

Team Roberts, Anderson Cheek
observers T.H. EPA) others

Location S-I
200 ft from Basin (Program)
30 ft from old ~~landfill~~
ditch.

Type Sediment

Water Depth 0

Spl Pt Des no standing water
~ 6" above water surface
high clay content

3 8 0207

Time 1345

Sample No 807
384

Vegetation removed before sampling,
sample collected with stainless
steel spoons. Sample homogenized
after vegetation (roots) removed.
Sample split into 2 250g
samples
sample and to BCM.

Keith D Roberts

:0 6 Dec 87

3 8 0208 : 41

Weather Partly Cloudy
warm
~65°

Sgl Pt Dec. - clear standing water 6" deep.

Basin Sample located in old plant outfall into Basin

Time: 1425 hr

Team - Roberts, Check, Anderson

Sample No. ~~[illegible]~~ KDR 941
~~[illegible]~~ KDR 308

Observers: ~~[illegible]~~ None.

Sampled with stainless steel spoon, vegetation removed and sample homogenized. Split into 2 250g samples sent to BCM

Location (S-B)
~600 ft from Road
center of channel
- moved 25 ft north of water sgl pt.
(due to large snake)

Lot of leaves, decaying vegetation in sample

Type: Sediment

Water Depth 0.5 ft

Keith D Rilett

returns on pH

42 9 Dec 87

Sample from wash water — first rinse taken and sent to BCM 1 liter, ¼ 250 ml. sample

Sample No. 281 (250 ml)
981 (1 lit)

Wash water from last 5 samplings.

Time - 1450 hrs.

Team: Roberts, Anderson, Check

Type: Water

Hg sample preserved with HNO_3 (pH < 2)

All samples iced.

Keith D Roberts

9 Dec 87 1 4

Two field blanks were prepared at boat landing site. 38 0209

Time - 1515 hr

2 250 ml samples.

~~Grab~~ Sample No.
971
413

Weather: partly cloudy, humid 65°

Team Roberts, Anderson Check

Type: Water (river)

Water provided by BCM in one gal plastic containers, carried in field / boat throughout sampling.

All samples iced and sent to BCM

Keith D Roberts

4 Dec 87 2300hr

3 8 0210

EPA Samples received from Tull and Proof KDR
2055hr 9 Dec 87
All samples preserved with ice
Sample 1 gal in glass (amber)
labeled
BNA H_2O Spike
12-7-87
relabeled as
Sample No 118

[redacted]

analyze for Organics

Sample 1 gal in glass (amber)
labeled
BNA H_2O Blank
12-7-87
relabeled as
No. 143
BNA H_2O Blank
12-7-87

analyze for organics

Sample 1 liter (plastic)
labeled Metals Blank
12-7-87
relabeled as
Sample No. 136
Metals Blank
12-7-87

Sample # 1 liter (plastic)
labeled
Metals Spike
12-7-87
relabeled as
Sample No. 301

[redacted]

[redacted]

Dec-87 2 of 2

EPA Samples (cont)

Sample 250 ml (glass)
labeled as
BNA Sed Blank
relabeled as
Sample No 760
BNA Sed Blank
12-7-87

Sample 250 ml (glass)
labeled as
Metals Blank
12-7-87
relabelled as
Sample No 810
Metals Blank
12-7-87

EPA Samples

Sample 250 ml (glass)
labeled as
BNA Sed Spike
12-7-87
relabeled as
Sample No 702
BNA Sed. Spike
12-7-87

Sample 1 liter (plastic)
labeled as
ICS
12-7-87
relabeled as
Sample No 948

[redacted]

(metals analysis)

EPA Samples 9 Dec 87

Custody seal in tact on cooler
Cooler opened in the presence of
C Tull and J Trudell
All samples in good condition
No broken bottles
Samples were still cold.

McIntosh Basin
Sampling 8 0212

All water samples from the eight sampling locations were shipped by air freight to BCM on 8 Dec 1987. Except Sample No 966 which was shipped on 9 Dec 87.

All sediment samples from the ten sampling locations were shipped by air freight to BCM on 9 Dec 1987.

All EPA samples (samples from EPA) were shipped to BCM on 10 Dec 87. These samples were received too late to ship on 9 Dec 87.

EPA splits of field samples (both water and sediment) were shipped 9 Dec 87.

All shipments (except the one to EPA)

were insured for $10,000. One day (next day) delivery was requested on all shipments

McIntosh Basin Sampling

General Fld Notes: 3 8 0213

All water sampling locations were marked with styrofoam buoys tied to bricks. Several buoys drifted prior to sediment sampling. Drift was caused by wind and/or boat wake across basin. Sediment samples were collected as close to water sampling locations as could be estimated.

~~Heavy~~ Rain occurred on the night of 7 Dec 87. Intermittent rain/drizzle continued into the morning of 8 Dec 87. Plant rainfall was 0.14 on 8 Dec and 0.2 on 9 Dec

Water in Basin was turbid in the western 1/3 of Basin. This appeared to be due to storm water runoff Turbid decreasing in eastern portion

Kurtis D Robert

of the Basin

EPA observers were
John A Trudell, III (Atlanta)
Charles Till (EPA ESD)

Kenneth D Robert

APPENDIX 3
FIELD OVERVIEW CHECKLIST

McINTOSH BASIN FIELD OVERVIEW CHECKLIST

SITE NAME	McIntosh Basin
LOCATION	Olin Plant, McIntosh AL
STUDY DATE(S)	December 7-9, 1987
FACILITY CONTACT	Toni Odom
PHONE NUMBER	8-421-1350
CONTRACTOR	BCM Converse, Inc. (John Tobin)
ADDRESS	1850 Gravers Road, Norristown, PA 19401
PHONE NUMBER	215/275-1190
PROJECT LEADER	Arnold L. Feldman 8-448-4510

OTHER CONTRACTOR/STATE PERSONNEL_____

EPA ESD OVERVIEW PERSONNEL John A. Trudell III, Charles Till

OTHER PERSONNEL AND AFFILIATION_____

PLANNING AND PREPARATION

Y or N

1) Was a study plan, work plan, site operations plan, etc. issued for this investigation? ___Y___

Date Issued: August 13, 1987/Revised October 11, 1987

If YES:

Was the study plan reviewed by ESD? ___Y___

Was the study plan acceptable? 10Nov87 ___Y___

SAMPLING

General Procedures

1) Were sampling locations properly selected? As specified by Plan. ___Y___

If No, explain _____

_____

_____

2) Were samples collected starting with the least likely contaminated and proceeding to the most likely contaminated? ___Y___

Remarks Collected in order which would minimize disturbance at water column by boat; contaminant levels are expected to be the same in all samples.

3) Were new disposable rubber gloves worn during collection of all samples? ___Y___

Remarks _____

_____

4) Was sampling equipment wrapped in aluminum foil and protected from possible contamination prior to sample collection? ___-___

If No, explain All sample equipment cleaned immediately prior to use.

Y or N

5) If equipment was cleaned in the field, were proper procedures used? (This includes storage method for rinse water and solvents) ___Y___

Followed EPA procedures.

6) What field instruments were used during this investigation:
pH/temperature meter, 100 foot tape measure, weight bottle sampler.

7) Were field instruments properly calibrated? ___Y___

Calibrated in laboratory; calibration checked daily in field prior to use.

8) Were calibration procedures documented in the field notes: ___Y___

Remarks_____

9) Were the samples chemically field preserved: ___Y___

Hg samples preserved with 5 ml of 70% HNO_3; all samples placed on ice immediately after collection.

10) Were the samples iced? ___Y___

11) Were samples for selected parameters field filtered: ___N___

If Yes, list parameters and describe procedures._____

Surface Water Sampling

1) What procedures and equipment were used to collect surface water samples? _____

At water depths <2 feet, grab samples were taken at 0.5D. At water depths ≥2 feet, weight bottle sampler was used.

Y or N

Who collected samples? S. E. Anderson and R. J. Cheek

2) Did the samplers wade in the stream during sample collection ___Y___

If Yes:

Did the sampler face upstream while collecting sample? ___Y___

Did the sampler insure that roiled sediments were not collected along with water sample? ___Y___

3) Note any deficiencies observed during the collection of the surface water samples None

Waste, Sludge, Soil/Sediment Sampling

1) What procedures including equipment were used to collect soil/sediment samples? Stainless steel scoops (spoons) were used where water depths were less than 1 foot. Where water depths were greater than 1 foot, ponar dredged was used.

2) Were the soil/sediment samples well mixed prior to placing the sample in the sample container? ___Y___

3) Note any deficiencies observed during the collection of the soil/sediment samples None

Total number of samples collected 10 sediment samples in duplicate

Other Sampling

1) What other types of samples were collected during this investigation?

_____

_____

_____

_____

Y or N

2) What procedures were used for the collection of these samples?_____

_____

_____

_____

Who collected samples?

_____

_____

_____

QUALITY ASSURANCE/QUALITY CONTROL

(While all of these QA/QC procedures are not necessarily used, please identify the specific techniques which were employed by sampling personnel.)

1) Did the sampling personnel utilize any field trip blanks? ___Y___

2) Did the sampling personnel utilize preservative blanks? ___Y___

If Yes, to either of the above questions, list the types and handling of the blanks Field and trip blanks were used for water (organics), water (Hg) and sediment samples. Water (Hg) samples preserved with HNO_3.

3) Were any equipment blanks collected? ___Y___

If Yes, list: Water samples for organics and Hg collected from dredge rinse water.

4) Were any duplicate samples collected? ___Y___

If Yes, list the types (parameter coverage, etc.) and describe their handling. All samples collected in duplicate. This includes water for Hg and organics and sediment for Hg and organics. All samples iced and shipped to BCM. EPA also receive one water sample for Hg, one water sample for organics and one sediment sample for Hg and organics.

Y or N

5) Were any spiked samples utilized? ___N___

If Yes, list the types (parameter coverage, etc.) and describe their handling._____

_____

_____

FIELD DOCUMENTATION AND CHAIN-OF-CUSTODY

1) Were split samples offered to the EPA. ___Y___

2) Were chain-of-custody records completed for all samples? ___Y___

3) Were sample tag numbers cross referenced to chain-of-custody forms? ___Y___

4) Were chain-of-custody form numbers recorded in the field log book? ___N___

5) Were all samples properly sealed at the time of collection? ___Y___

6) Were samples locked in vehicle or kept in a secure place after collection? ___Y___

7) Were all sample tags and chain-of-custody forms signed by sample collector(s)? ___Y___

8) Were sampling locations adequately documented? ___Y___

If No, explain_____

_____

_____

_____

9) Was sampling documented with photographs? by EPA ___Y___

10) Were the samples shipped to a contract laboratory? ___Y___

Were the samples properly packed for shipment? ___Y___
Individually wrapped in bubble pack.

APPENDIX III

SAMPLING PROCEDURES

McINTOSH BASIN

WATER SAMPLING PROCEDURE

1. Measure water depth

2. Measure pH at 0.5 depth

3. Measure temperature of water at 1 foot intervals (depth)

4. Collect water sample using weighted bottle sampler

   a. If water contains two layers with different temperatures, collect 2 liters from mid point of each layer.

   b. If water contains no layers with different temperatures, sample as follows:

      1) Water less than 5 feet deep, sample 4 liters at 0.5D. If water is less than 1 foot deep, weighted bottle sampler will not be used.

      2) Water greater than 5 feet but less than 10 feet deep, sample 2 liters at 0.33D and 2 liters at 0.67D for organic analysis.

      3) Water greater than 10 feet, sample 1 liter at 0.20D, 1 liter at 0.4D, 1 liter at 0.6D and 1 liter at 0.8D for organic analysis.

   c. Composite water samples in 4 liter glass bottles. Shake sample well. Split sample into three 1 liter samples (2 for BCM and 1 for EPA) for organics and three 250 ml samples.

5. Mercury samples will be acidified to a pH of less than 2.0 with 70% ACS reagent grade nitric acid.

6. Mark water sampling location with an anchored styrofoam block.

7. Water samples for organics will be collected in glass bottles. Water samples for mercury will be collected in polyethylene bottles.

8. Clean bottles will be used at each sampling point and sampling depth. Weighted bottle sampler will be cleaned at each sampling location prior to use.

9. The following data are recorded in the field log book:

   a. Date

   b. Observable weather conditions (sunny, cloudy, etc.)

   c. Observable basin condition (clear, muddy, etc.)

   d. Sampling team members names

e. Sample location

f. Sample type (water, sediment)

g. Water depth, temperature, pH

h. Description of sampling point

i. Time sample collected

j. Sample number

k. Number and volume of samples taken

l. Sampling methodology

m. Field preservation, if any

n. Sample distribution and how transported

o. Signatures of sampling team members

10. The following data are recorded on each sample bottle:

a. Sample number

b. Sample identification

c. Sample type

d. Name of collector

e. Date and time of collection

f. Place of collection

g. Sample preservation information

h. Analysis required

i. "Olin Corporation, McIntosh, Alabama"

11. Each sample bottle will be sealed with a signed custody seal that contains the following information: sample number, date, time, location and name of collector.

12. Each sample will be placed on ice after collection.

13. A chain-of-custody record will be prepared and accompany each sample during shipment to laboratory.

KDR/jmm
12/11/87
194

McINTOSH BASIN

SEDIMENT SAMPLING PROCEDURES

1. Measure water depth

2. Measure temperature of water at 0.5D

3. Measure pH of water at 0.5D

4. Using ponar dredge collect sample of sediment. If water depth is less than 1 foot, sediment samples will be collected with stainless steel spoons.

5. Place sample in aluminum foil-lined pan. Remove sticks and other vegetative matter. If sample contains excessive water, allow sample to stand for a few minutes and carefully decant water. Homogenize sediment thoroughly. Split out three 100 to 200 gram samples (two samples for BCM and one for EPA).

6. The followi[illegible]re recorded in the field log book:

   a. Date

   b. Observable weather conditions (sunny, cloudy, etc.)

   c. Observable basin condition (clear, muddy, etc.)

   d. Sampling team members names

   e. Sample location

   f. Sample type (water, sediment)

   g. Water depth, temperature, pH

   h. Description of sampling point

   i. Time sample collected

   j. Sample number

   k. Number and volume of samples taken

   l. Sampling methodology

   m. Field preservation, if any

   n. Sample distribution and how transported

   o. Signatures of sampling team members

7. The following data are recorded on each sample bottle:

   a. Sample number

   b. Sample identification

   c. Sample type

   d. Name of collector

   e. Date and time of collection

   f. Place of collection

   g. Sample preservation information

   h. Analysis required

   i. "Olin Corporation, McIntosh, Alabama"

8. Each sample bottle will be sealed with a signed custody seal that contains the following information: sample number, date, time, location and name of collector.

9. Each sample bottle will be placed on ice after collection.

10. A chain-of-custody record will be prepared and accompany each sample during shipment to laboratory.

11. Ponar dredge, mixing pan and mixing spatula will be cleaned using designated procedures after collection of the sample from each location.

KDR/jmm
12/11/87
194

McINTOSH FIELD PROCEDURES

DREDGE CLEANING PROCEDURE

1. Rinse/brush off sediment with basin water
2. Wash with tap water and alconox
3. Rinse with tap water
4. Rinse with deionized water
5. Rinse twice with pesticide-grade isopropanol
6. ~~Rinse thoroughly with organic-free water*~~ Not available
7. Allow to air dry
8. Wrap with aluminum foil

* may be omitted if organic-free water is not available

Reference ESD SOP and QA manual, April 1, 1986, Secton B.8.3

SUPPLIES NEEDED

Alconox - 1 lb
Pesticide grade Isopropanol - 2 gallons
Wash bottle (1000 ml) - 2 each
Wash tubs - 2 each
Nylon brushes - 2 each

KDR/jmm
12/11/87
194

APPENDIX 4
CHAIN-OF-CUSTODY

Olin CHEMICALS 3 8 0230

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin 107	1000	<2	1	Hg
" " 406	1205	<2	1	Hg
" " 712	1320	<2	1	Hg
" " 925	1010	<2	1	Hg
" " 257	1350	<2	1	Hg
" " ~~KDS 303~~	~~1010~~	~~<2~~	+	~~Hg~~ Sent to EPA

Collector's Name Keith D Robert (Signature) Date of Collection 8 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory Div. 1850 Gravers Road Norristown PA 19401
(Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Keith D Robert (Signature of collector) | Sr Assoc Env Aff Spec (Title) | Dec 8, 1987/1800 (Inclusive dates/times)

Remarks: _____

1. John T Rivera (Signature) | Sample Custodian (Title) | 12/9/1987/0900 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) | _____ (Title) | _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) | _____ (Title) | _____ (Inclusive dates/times)

Remarks: _____

Olin CHEMICALS 3 8 0231

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin # 316	1500	<2	1	Hg
" " # 492	1430	"	1	"
" " # 838	1500	"	1	"
" " # 283	1515	"	1	"
" " # 349	0850	"	1	"
" " # 399	1320	"	1	"

Collector's Name Keith D Robert (Signature) Date of Collection 8 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory Div 1850 Gravers Road Norristown PA 19401
(Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Keith D Robert (Signature of collector) Sr Env Affairs Spec (Title) 8 Dec 87 / 1800 (Inclusive dates/times)

Remarks: _____

1. John T Rose (Signature) Sample Custodian (Title) 12/9/87/0900 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

3 8 0232

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin # 908	1515	<2	1	Hg
" " # 221	1430	<2	1	Hg
" " # 523	1130	<2	1	Hg
" " # 325	0850	<2	1	Hg
" " # 312	1205	<2	1	Hg
" " # 442	1130	<2	1	Hg

Collector's Name Keith O Robert (Signature) Date of Collection 8 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory Div 1850 Graves Road Norristow
(Name and address of organization receiving sample)

2. _____

3. _____

CHAIN OF POSSESSION:

Keith O Robert (Signature of collector) Sr Assoc Env AE Spec (Title) 8 Dec 87 / 1800 (Inclusive dates/times)

Remarks: _____

1. John T. Rowe (Signature) Sample Custodian (Title) 12/9/87/0900 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

3 8 0233

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin # Trip Blank			1	Hg
" " # Trip Blank			1	Hg

Collector's Name Kath D Robert (Signature) Date of Collection 8 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory Div, 1850 Graves Road, Norristown PA 19401
(Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Kath D Robert | Sr Env Affairs Spec | 8 Dec 87 1800
(Signature of collector) (Title) (Inclusive dates/times)

Remarks: _____

1. John T. Rivera | Sample Custodian | 12/9/87/0900
(Signature) (Title) (Inclusive dates/times)

Remarks: _____

2. _____ | _____ | _____
(Signature) (Title) (Inclusive dates/times)

Remarks: _____

3. _____ | _____ | _____
(Signature) (Title) (Inclusive dates/times)

Remarks: _____

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

3 8 0234

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin # 942	1515		1	Organics (PCNB, DCB)
" " # 102	0840		1	" " "
" " # 509	1205		1	" " "
" " # 451	1205		1	" " "
# 869	1005		1	" " "
# 878	1515		1	" " "

Collector's Name Keith D Roberts (Signature) Date of Collection 8 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory Dr 1850 Gravers Road Norristown PA 19401
(Name and address of organization receiving sample)

2. _____

3. _____

CHAIN OF POSSESSION:

Keith D Roberts (Signature of collector) Sr Assoc Env Aff Spec (Title) 8 Dec 87 / 1900 (Inclusive dates/times)

Remarks: _____

1. John T. Rue (Signature) Sample Custodian 12/9/87 (Title) 12/9/87 1900 Sample Custo (Inclusive dates/times)

Remarks: No Field Blanks / Custody Seals in Tact

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

2 of 4

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

3 8 0235

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin # 420	1320		1	Organics (PCNB, DCB)
" " Trip Blank	—		2 KDR	" " "
" " # 424	1350		1	" " "
" " Trip Blank	—		1	" " "
" " # 777	1500		1	" " "
" " # 341	1130		1	" " "

Collector's Name Kurt D Plaet (Signature) Date of Collection 8 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory Div 1850 Graves Road Norristown PA 19401
(Name and address of organization receiving sample)

2. _____

3. _____

CHAIN OF POSSESSION:

Kurt D Plaet (Signature of collector) ~~Supervisor Air Sparge~~ (Title) 8 Dec 87 / 1900 (Inclusive dates/times)

Remarks: _____

1. John T. Ruane (Signature) Sample Custodian (Title) 12/9/87/0900 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

Do 1 7

CHAIN OF CUSTODY RECORD

3 8 0236

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin #737	0840		1	Organics (RNB DCB)
" " #672	1320		1	" " "
" " #150	1425		1	" " "
" " #696	1425		1	" " "
" " #560	1130		1	" (RNB, DCB)
" " #654	1500		1	" " "

Collector's Name Keith D Roberts (Signature) Date of Collection 8 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory Div, 1850 Gravers Road, Norristown PA 19401
(Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Keith D Roberts (Signature of collector) — Sr Assoc Env Aff. Spec (Title) — 8 Dec 87 / 1900 (Inclusive dates/times)

Remarks: _____

1. John T. Rose (Signature) — Sample Custodian (Title) — 12/9/87/0900 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) — _____ (Title) — _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) — _____ (Title) — _____ (Inclusive dates/times)

Remarks: _____

4 of 4

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

3 8 0237

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin #362	1005		1	Organics (PCB, DCB)
" " #574	1360		1	" " "

Collector's Name Ruth D Roberts (Signature) Date of Collection 8 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory Div 1850 Graves Road, Norristown PA 19401
(Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Ruth D Roberts — Sr Area Env Affairs Spec — 8 Dec 87 / 1900
(Signature of collector) (Title) (Inclusive dates/times)

Remarks: _____

1. John T. Revere — Sample Custodian — 12/9/87/0900
(Signature) (Title) (Inclusive dates/times)

Remarks: _____

2. _____ _____ _____
(Signature) (Title) (Inclusive dates/times)

Remarks: _____

3. _____ _____ _____
(Signature) (Title) (Inclusive dates/times)

Remarks: _____

1 of 3

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

3 8 0238

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin # 941	1425	-	1	Hg + Organics
# 532	1335	-	1	" "
# 384	1345	-	1	" "
# 807	1345	-	1	" "
# 217	1030	-	1	" "
# 308	1425	-	1	" "

Collector's Name Keith D Roberts (Signature) Date of Collection 9 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory, 1850 Gravers Road Norristown PA 19401
(Name and address of organization receiving sample)

2. _____

3. _____

CHAIN OF POSSESSION:

Keith D Roberts (Signature of collector) Sr Asso Env Aff Spec (Title) 9 Dec 87 / 1900 (Inclusive dates/times)

Remarks: _____

1. John T. Rose (Signature) Sample Custodian (Title) 12/10/87/0930 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

CHAIN OF CUSTODY RECORD

3 8 0239

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin # 537	1145	–	1	Hg + Organics
" " # 981	1450	–	1	" "
" " # 237	1250	–	1	" "
" " # 577	0920	–	1	" "
" " # 538	0950	–	1	" "
" " # 974	1515	–	1	" "

Collector's Name Keith D Robert (Signature) Date of Collection 9 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory 1850 Gravers Road, Norristown PA 19401
(Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Keith D Robert (Signature of collector) Sr Research Tech Spec (Title) 9 Dec 87 (1900) (Inclusive dates/times)

Remarks: _____

1. John T. Rowe (Signature) Sample Custodian (Title) 12/10/87 / 0930 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

CHAIN OF CUSTODY RECORD

3 8 0240

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin #919	1015	—	1	Hg + Organics
" " #408	1515	—	1	" "
" " Trip Blank			1	

Collector's Name Ruth D Roberts (Signature) Date of Collection 9 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory 1850 Gravers Road Norristown PA 19401
(Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Ruth D Roberts (Signature of collector) Surface Env Mgr Spec (Title) Dec 9 87 / 1900 (Inclusive dates/times)

Remarks: _____

1. John T. Rowe (Signature) Sample Custodian (Title) 12/9/87/0930 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

1/2

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

3 8 0241

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Bash # 183	1335	—	1	Hg + Organics
Trip Blank	—	—	1	" "
McIntosh Bash # 615	1015		1	" "
" " 782	1315	+-	1	" "
" " 281	1450	—	1	Organics
" " 966	1315	—	1	Hg

Collector's Name Keith D Robert (Signature) Date of Collection 9 Dec 87

SAMPLE RECEIVERS:

1. BCM Lab 1850 Gravers Rd, Norristown PA 194 (Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Keith D Robert [redacted] 9 Dec 87 1700
(Signature of collector) (Title) (Inclusive dates/times)

Remarks: _____

1. John T. Ryan (Signature) Sample Custodian (Title) 12/11/87 09-50 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

2/2

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

CHAIN OF CUSTODY RECORD 3 8 0242

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin #401	0920	—	1	Hg + Organics
" " #507	0950	—	1	" "
" " #267	1015	—	1	" "
" " #907	1250	—	1	" "
" " #483	1030	—	1	" "
" " #790	1315	—	1	" "

Collector's Name Ruth D Robert (Signature) Date of Collection 9 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory, 1850 Gravers Road Norristown PA 19401
(Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Ruth D Robert (Signature of collector) Sr Res Env Aff (Title) 9 Dec 87 / 1700 (Inclusive dates/times)

Remarks: _____

1. John F Rowe (Signature) Sample Custodian (Title) 12/11/87/0950 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

1 of 2

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

3 8 0243

CHAIN OF CUSTODY RECORD

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin # 118	2300	-	1	Organics
" " # 143	2300		1	Organics
" " # 136	2300		1	Hg
" " # 301	2300		1	Hg
" " # 760	2310		1	Organics
" " # 810	2310		1	Hg

Collector's Name Keith O Roberts (Signature) Date of Collection 9Dec87

SAMPLE RECEIVERS:

1. BCM Laboratory, 1850 Gravers Road Norristown PA 19401
(Name and address of organization receiving sample)

2. _____

3. _____

CHAIN OF POSSESSION:

Keith O Roberts Sr Area Env Aff Spec 10Dec87 0800
(Signature of Custodian) (Title) (Inclusive dates/times)

Remarks: _____

1. John T. Ross Sample Custodian 12/11/87 0920
(Signature) (Title) (Inclusive dates/times)

Remarks: _____

2. _____ _____ _____
(Signature) (Title) (Inclusive dates/times)

Remarks: _____

3. _____ _____ _____
(Signature) (Title) (Inclusive dates/times)

Remarks: _____

2052

Olin CHEMICALS

McINTOSH PLANT — McINTOSH, ALABAMA 36553 (205) 944-2231

CHAIN OF CUSTODY RECORD

3 8 0244

Sample Location	Time	pH	# Containers	Analyses Requested/ Remarks
McIntosh Basin # 702	2320	—	1	Organics
" " # 948	2320	—	1	Hg.

Collector's Name Keith D Rolest (Signature) Date of Collection 6 Dec 87

SAMPLE RECEIVERS:

1. BCM Laboratory 1850 Gravers Road, Norristown PA 1940 (Name and address of organization receiving sample)
2. _____
3. _____

CHAIN OF POSSESSION:

Keith D Rolest [redacted] 6 Dec 87 0800
(Signature of [redacted]) (Title) (Inclusive dates/times)

Remarks: _____

1. John T. Rose (Signature) Sample Custodian (Title) 12/11/87/0920 (Inclusive dates/times)

Remarks: _____

2. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

3. _____ (Signature) _____ (Title) _____ (Inclusive dates/times)

Remarks: _____

APPENDIX 5
ANALYTICAL ANALYSIS